

EDC430 NCTM Mathematics Content Assessment: History and Cultural Diversity

One of the ways we assess your development of mathematics content knowledge is by asking you to demonstrate your understanding of and insights into the historical development of various content areas and the contributions that were made in these areas by different cultures and individual mathematicians. You will have gained some perspectives during the mathematics courses you have taken for your BA in mathematics or equivalent background, but you will also need to do some research. Below you will find a list of resources that will help you get started. You should work on this throughout the pre-student teaching semester and submit your work by the end of that semester to Taskstream. You will produce evidence of your understanding and insight for the following standards:

- A.1.5 Historical development and perspectives of **number, number systems, and quantity** including contributions of significant figures and diverse cultures (MTH 307 and MTH 382)
- A.2.7 Historical development and perspectives of **algebra** including contributions of significant figures and diverse cultures (MTH 215, MTH 316)
- A.3.10 Historical development and perspectives of **geometry and trigonometry** including contributions of significant figures and diverse cultures (MTH 322)
- A.4.6 Historical development and perspectives of **statistics and probability** including contributions of significant figures and diverse cultures (MTH 451)
- A.5.6 Historical development and perspectives of **calculus** including contributions of significant figures and diverse cultures (MTH 141, MTH 142, MTH 243)
- A.6.5 Historical development and perspectives of **discrete mathematics** including contributions of significant figures and diverse cultures (MTH 447)

For each standard above,

- A. Describe the historical development of a specific topic within the given content area (2-3 pages)
- B. Describe at least one contribution from a non-western culture in this content area that has impacted the development of the topic discussed in part A. (1-2 pages)
- C. Describe at least one major contribution from a mathematician that had a significant impact on the development of your chosen topic in this content area. You are encouraged to investigate both male and female mathematicians and mathematicians of various ethnicities. (1-2 pages)
- D. Explain how your understanding and insight into the historical development and contributions of various cultures and mathematicians may impact your future teaching of mathematics. (1-2 pages)
- E. Include a list of references used for this work.

All work must be done in APA style and use proper citation of works and quotations by others. Include a cover page and a table of contents page.

Suggested Book Resources:

A History of Mathematics, 2nd Ed., Carl B. Boyer, Revised by Uta C. Merzbach, Wiley, NY, 1991
History of Mathematics, 2 volumes, David E. Smith, Dover, New York, 1958.
A Concise History of Mathematics, Dirk J. Struik, Dover Publications, New York, 1967.
Mathematical Thought from Ancient to Modern Times, Morris Kline, Oxford University Press, New York, 1972.
An Introduction to the History of Mathematics, Howard Eves, Holt, Rhinehart and Winston, New York, 1969
Ascher, Marcia, *Ethnomathematics: A Multicultural View of Mathematical Ideas*, Brooks-Cole, 1991
Ascher, Marcia, *Mathematics Elsewhere: An Exploration of Ideas Across Cultures*, Princeton, 2002.

On-line Resources:

Wikipedia: https://en.wikipedia.org/wiki/History_of_mathematics and <https://en.wikipedia.org/wiki/Ethnomathematics>
The Story of Mathematics: <http://www.storyofmathematics.com>
History Topics Index: <http://www-history.mcs.st-andrews.ac.uk/Indexes/HistoryTopics.html>
History of Mathematics: http://www.math.tamu.edu/~dallen/masters/hist_frame.htm
Mathematicians of the African Diaspora: <http://www.math.buffalo.edu/mad/00.INDEXmad.html>

On Twitter: @mathshistory

Portfolio Performance Criteria:

Criterion	Above the Standard (3)	Meets the Standard (2)	Does not meets the Standard (1)
A.1.5 Historical development and perspectives of number, number systems, and quantity including contributions of significant figures and diverse cultures	The candidate selects a foundational topic and discusses its historical development in a coherent and rigorous manner clearly explaining its importance to the development of number, number systems, and quantity. The candidate clearly links contributions of one or more cultures and one or more mathematicians within these cultures to the development of this foundational topic within number, number systems, and quantity. The candidate clearly and coherently explains realistic and relevant implications for the teaching of number, number systems, and quantity from the indicated cultural and historical perspectives.	The candidate selects a relevant topic and discusses its historical development in a clear fashion explaining its importance to the development of number, number systems, and quantity. The candidate identifies relevant contributions of a culture and a mathematician within this culture to the development of this topic within number, number systems, and quantity. The candidate explains realistic and relevant implications for the teaching of number, number systems, and quantity from the indicated cultural and historical perspectives.	The candidate selects a topic that is not relevant to the content area and discusses its historical development in a superficial fashion lacking an explanation of its importance to the development of number, number systems, and quantity. The candidate identifies a minimally related or unrelated contribution of a culture or a mathematician within this culture to the development of this topic within number, number systems, and quantity. The candidate explains some implications for the teaching of number, number systems, and quantity that lack the indicated cultural and historical perspectives or interpret these incorrectly.
A.2.7 Historical development and perspectives of algebra including contributions of significant figures and diverse cultures	The candidate selects a foundational topic and discusses its historical development in a coherent and rigorous manner clearly explaining its importance to the development of algebra. The candidate clearly links contributions of one or more cultures and one or more mathematicians within these cultures to the development of this foundational topic within algebra. The candidate clearly and coherently explains realistic and relevant implications for the teaching of algebra from the indicated cultural and historical perspectives.	The candidate selects a relevant topic and discusses its historical development in a clear fashion explaining its importance to the development of algebra. The candidate identifies relevant contributions of a culture and a mathematician within this culture to the development of this topic within algebra. The candidate explains realistic and relevant implications for the teaching of algebra from the indicated cultural and historical perspectives.	The candidate selects a topic that is not relevant to the content area and discusses its historical development in a superficial fashion lacking an explanation of its importance to the development of algebra. The candidate identifies a minimally related or unrelated contribution of a culture or a mathematician within this culture to the development of this topic within algebra. The candidate explains some implications for the teaching of algebra that lack the indicated cultural and historical perspectives or interpret these incorrectly.
A.3.10 Historical development and perspectives of geometry and trigonometry including	The candidate selects a foundational topic and discusses its historical development in a coherent and rigorous manner clearly explaining its importance to the development of	The candidate selects a relevant topic and discusses its historical development in a clear fashion explaining its importance to the development of geometry and trigonometry.	The candidate selects a topic that is not relevant to the content area and discusses its historical development in a superficial fashion lacking an explanation of its importance to the development of

contributions of significant figures and diverse cultures	<p>geometry and trigonometry. The candidate clearly links contributions of one or more cultures and one or more mathematicians within these cultures to the development of this foundational topic within geometry and trigonometry.</p> <p>The candidate clearly and coherently explains realistic and relevant implications for the teaching of geometry and trigonometry from the indicated cultural and historical perspectives.</p>	<p>The candidate identifies relevant contributions of a culture and a mathematician within this culture to the development of this topic within geometry and trigonometry.</p> <p>The candidate explains realistic and relevant implications for the teaching of geometry and trigonometry from the indicated cultural and historical perspectives.</p>	<p>geometry and trigonometry. The candidate identifies a minimally related or unrelated contribution of a culture or a mathematician within this culture to the development of this topic within geometry and trigonometry.</p> <p>The candidate explains some implications for the teaching of geometry and trigonometry that lack the indicated cultural and historical perspectives or interpret these incorrectly.</p>
A.4.6 Historical development and perspectives of statistics and probability including contributions of significant figures and diverse cultures	<p>The candidate selects a foundational topic and discusses its historical development in a coherent and rigorous manner clearly explaining its importance to the development of statistics and probability.</p> <p>The candidate clearly links contributions of one or more cultures and one or more mathematicians within these cultures to the development of this foundational topic within statistics and probability.</p> <p>The candidate clearly and coherently explains realistic and relevant implications for the teaching of statistics and probability from the indicated cultural and historical perspectives.</p>	<p>The candidate selects a relevant topic and discusses its historical development in a clear fashion explaining its importance to the development of statistics and probability.</p> <p>The candidate identifies relevant contributions of a culture and a mathematician within this culture to the development of this topic within statistics and probability.</p> <p>The candidate explains realistic and relevant implications for the teaching of statistics and probability from the indicated cultural and historical perspectives.</p>	<p>The candidate selects a topic that is not relevant to the content area and discusses its historical development in a superficial fashion lacking an explanation of its importance to the development of statistics and probability.</p> <p>The candidate identifies a minimally related or unrelated contribution of a culture or a mathematician within this culture to the development of this topic within statistics and probability.</p> <p>The candidate explains some implications for the teaching of statistics and probability that lack the indicated cultural and historical perspectives or interpret these incorrectly.</p>
A.5.6 Historical development and perspectives of calculus including contributions of significant figures and diverse cultures	<p>The candidate selects a foundational topic and discusses its historical development in a coherent and rigorous manner clearly explaining its importance to the development of calculus.</p> <p>The candidate clearly links contributions of one or more cultures and one or more mathematicians within</p>	<p>The candidate selects a relevant topic and discusses its historical development in a clear fashion explaining its importance to the development of calculus.</p> <p>The candidate identifies relevant contributions of a culture and a mathematician within this culture to the development of this topic within calculus.</p> <p>The candidate explains realistic and</p>	<p>The candidate selects a topic that is not relevant to the content area and discusses its historical development in a superficial fashion lacking an explanation of its importance to the development of calculus.</p> <p>The candidate identifies a minimally related or unrelated contribution of a culture or a mathematician within this</p>

	these cultures to the development of this foundational topic within calculus. The candidate clearly and coherently explains realistic and relevant implications for the teaching of calculus from the indicated cultural and historical perspectives.	relevant implications for the teaching of calculus from the indicated cultural and historical perspectives.	culture to the development of this topic within calculus. The candidate explains some implications for the teaching of calculus that lack the indicated cultural and historical perspectives or interpret these incorrectly.
A.6.5 Historical development and perspectives of discrete mathematics including contributions of significant figures and diverse cultures	The candidate selects a foundational topic and discusses its historical development in a coherent and rigorous manner clearly explaining its importance to the development of discrete mathematics. The candidate clearly links contributions of one or more cultures and one or more mathematicians within these cultures to the development of this foundational topic within discrete mathematics. The candidate clearly and coherently explains realistic and relevant implications for the teaching of discrete mathematics from the indicated cultural and historical perspectives.	The candidate selects a relevant topic and discusses its historical development in a clear fashion explaining its importance to the development of discrete mathematics. The candidate identifies relevant contributions of a culture and a mathematician within this culture to the development of this topic within discrete mathematics. The candidate explains realistic and relevant implications for the teaching of discrete mathematics from the indicated cultural and historical perspectives.	The candidate selects a topic that is not relevant to the content area and discusses its historical development in a superficial fashion lacking an explanation of its importance to the development of discrete mathematics. The candidate identifies a minimally related or unrelated contribution of a culture or a mathematician within this culture to the development of this topic within discrete mathematics. The candidate explains some implications for the teaching of discrete mathematics that lack the indicated cultural and historical perspectives or interpret these incorrectly.